SEQUENCE LISTING

<110> DAICEL Chemical Industries LTD.

<120> Novel (R)-2,3-butanediol dehydrogenase

<130> D1-A0009

<140>
<141>

<150> JP 2000-333363
<151> 2000-10-31

<160> 17

<170> PatentIn Ver. 2.1

<210> 1
<211> 1143
<212> DNA
<213> Pichia angusta

<400> 1
atgaaaggtt tactttatta cggtacaaac gatattcgct actccgaaac ggttcctgaa 60
ccggagatca agaatcccaa cgatgtcaag atcaaagtca gctattgtgg aatctgtggc 120
acggacttga aagaattcac atattctgga ggtcctgttt ttttccctaa acaaggcacc 180
aaggacaaga tttcgggata cgaacttcct ctctgtcctg gacatgaatt tagcggaacg 240
gtggtcgagg ttggctctgg tgtcacaagt gtgaaacctg gtgacagagt cgcagttgaa 300
gctacgtcgc attgctccga cagatcgcgc tacaaggaca cggtcgccca agaccttggg 360
ctctgtatgg cctgccagag cggatctccg aactgctgtg cgtcgctgag cttctgcggt 420
ttgggtggtg ccagcggcgg ttttgccgag tacgtcgttt acggtgagga ccacatggtc 480
aagctgccag actcgattcc cgacgatatt ggagcactgg ttgagcctat ttctgttgcc 540
tggcatgctg ttgaacgcgc tagattccag cctggtcaga cggccctggt tcttggagga 600
ggtcctatcg gccttgccac cattcttgct ctgcaaggcc atcatgcggg caaaattgtg 660
tgttccgagc cggccttgat cagaagacag tttgcaaagg aactgggcgc tgaagtgttc 720

gatccttcta catgtgacga cgcaaatgct gttctcaagg ctatggtgcc ggagaacgag 780
ggattccatg cagccttcga ctgctctggt gttcctcaga cattcaccac ctcaattgtc 840
gccacgggac cttctggaat cgccgtcaat gtggccgttt ggggagacca cccaattgga 900
ttcatgccaa tgtctctgac ttaccaggag aaatacgcta ccggctccat gtgctacacc 960
gtcaaggact tccaggaagt tgtcaaggcc ttggaagatg gtctcatatc tttggacaaa 1020
gcgcgcaaga tgattacagg caaagtccac ctaaaggacg gagtcgagaa gggctttaaa 1080
cagctgatcg agcacaagga gaacaatgtc aagatcctgg tgacgccgaa cgaggtttcc 1140
taa 1143

<210> 2
<211> 380
<212> PRT
<213> Pichia angusta

<400> 2

Met Lys Gly Leu Leu Tyr Tyr Gly Thr Asn Asp Ile Arg Tyr Ser Glu
1 5 10 15

Thr Val Pro Glu Pro Glu Ile Lys Asn Pro Asn Asp Val Lys Ile Lys
20 25 30

Val Ser Tyr Cys Gly Ile Cys Gly Thr Asp Leu Lys Glu Phe Thr Tyr
35 40 45

Ser Gly Gly Pro Val Phe Phe Pro Lys Gln Gly Thr Lys Asp Lys Ile
50 55 60

Ser Gly Tyr Glu Leu Pro Leu Cys Pro Gly His Glu Phe Ser Gly Thr
65 70 75 80

Val Val Glu Val Gly Ser Gly Val Thr Ser Val Lys Pro Gly Asp Arg
85 90 95

Val Ala Val Glu Ala Thr Ser His Cys Ser Asp Arg Ser Arg Tyr Lys
100 105 110

Asp Thr Val Ala Gln Asp Leu Gly Leu Cys Met Ala Cys Gln Ser Gly
115 120 125

Ser Pro Asn Cys Cys Ala Ser Leu Ser Phe Cys Gly Leu Gly Gly Ala
130 135 140

Ser Gly Gly Phe Ala Glu Tyr Val Val Tyr Gly Glu Asp His Met Val
145 150 155 160

Lys Leu Pro Asp Ser Ile Pro Asp Asp Ile Gly Ala Leu Val Glu Pro
165 170 175

Ile Ser Val Ala Trp His Ala Val Glu Arg Ala Arg Phe Gln Pro Gly
180 185 190

Gln Thr Ala Leu Val Leu Gly Gly Gly Pro Ile Gly Leu Ala Thr Ile
195 200 205

Leu Ala Leu Gln Gly His His Ala Gly Lys Ile Val Cys Ser Glu Pro
210 215 220

Ala Leu Ile Arg Arg Gln Phe Ala Lys Glu Leu Gly Ala Glu Val Phe
225 230 235 240

Asp Pro Ser Thr Cys Asp Asp Ala Asn Ala Val Leu Lys Ala Met Val
245 250 255

Pro Glu Asn Glu Gly Phe His Ala Ala Phe Asp Cys Ser Gly Val Pro
260 265 270

Gln Thr Phe Thr Thr Ser Ile Val Ala Thr Gly Pro Ser Gly Ile Ala
275 280 285

Val Asn Val Ala Val Trp Gly Asp His Pro Ile Gly Phe Met Pro Met
290 295 300

Ser Leu Thr Tyr Gln Glu Lys Tyr Ala Thr Gly Ser Met Cys Tyr Thr
305 310 315 320

Val Lys Asp Phe Gln Glu Val Val Lys Ala Leu Glu Asp Gly Leu Ile
325 330 335

Ser Leu Asp Lys Ala Arg Lys Met Ile Thr Gly Lys Val His Leu Lys
340 345 350

Asp Gly Val Glu Lys Gly Phe Lys Gln Leu Ile Glu His Lys Glu Asn
355 360 365

Asn Val Lys Ile Leu Val Thr Pro Asn Glu Val Ser
370 375 380

<210> 3
<211> 10
<212> PRT
<213> Pichia angusta

<400> 3
Lys Pro Gly Asp Arg Val Ala Val Glu Ala
1 5 10

<210> 4
<211> 21
<212> PRT
<213> Pichia angusta

<400> 4
Ala Thr Ser His Cys Ser Asp Arg Ser Arg Tyr Lys Asp Thr Val Ala
1 5 10 15

Gln Asp Leu Gly Leu
20

<210> 5
<211> 6
<212> PRT
<213> Pichia angusta

<400> 5
Phe His Ala Ala Phe Asp
1 5

<210> 6
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<220>
<221> misc_feature
<222> 6, 9, 15, 18
<223> n is a or c or g or t.

<400> 6
aarccnggng aymgngtngc 20

<210> 7
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<220>
<221> misc_feature
<222> 9, 12
<223> n is a or c or g or t.

<400> 7
tcrtcraang cngcrtgraa 20

<210> 8
<211> 530
<212> DNA
<213> Pichia angusta

<400> 8
aagccgggtg atcgtgtcgc agttgaagct acgtcgcatt gctccgacag atcgcgctac 60
aaggacacgg tcgcccaaga ccttgggctc tgtatggcct gccagagcgg atctccgaac 120
tgctgtgcgt cgctgagctt ctgcggtttg ggtggtgcca gcggcggttt tgccgagtac 180
gtcgtttacg gtgaggacca catggtcaag ctgccagact cgattcccga cgatattgga 240
gcactggttg agcctatttc tgttgcctgg catgctgttg aacgcgctag attccagcct 300
ggtcagacgg ccctggttct tggaggaggt cctatcggcc ttgccaccat tcttgctctg 360
caaggccatc atgcgggcaa aattgtgtgt tccgagccgg ccttgatcag aagacagttt 420
gcaaaggaac tgggcgctga agtgttcgat ccttctacat gtgacgacgc aaatgctgtt 480
ctcaaggcta tggtgccgga gaacgaggga ttccacgccg ccttcgatga 530

<210> 9
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<400> 9
ttggcatgcg atctgtcgga gcaatg 26

<210> 10
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<400> 10
tgagcatgca aatgctgttc tcaaggc 27

<210> 11
<211> 107
<212> DNA
<213> Pichia angusta

<400> 11
gaatttagcg gaacggtggt cgaggttggc tctggtgtca caagtgtgaa acctggtgac 60
agagtcgcag ttgaagctac gtcgcattgc tccgacagat cgcatgc 107

<210> 12
<211> 706
<212> DNA
<213> Pichia angusta

<400> 12
gcatgcaaat gctgttctca aggctatggt gccggagaac gagggattcc atgcagcctt 60
cgactgctct ggtgttcctc agacattcac cacctcaatt gtcgccacgg gaccttctgg 120
aatcgccgtc aatgtggccg tttggggaga ccacccaatt ggattcatgc caatgtctct 180
gacttaccag gagaaatacg ctaccggctc catgtgctac accgtcaagg acttccagga 240
agttgtcaag gccttggaag atggtctcat atctttggac aaagcgcgca agatgattac 300
aggcaaagtc cacctaaagg acggagtcga gaagggcttt aaacagctga tcgagcacaa 360
ggagaacaat gtcaagatcc tggtgacgcc gaacgaggtt tcctaactaa taatatacat 420
acatcataca tatgtatgtc ctagagccaa gacttgcgca ttaggaaaaa tagctggtag 480
tttgcattat ggtggccggc ctcccaggaa attaatctat gatttacata tggactcgat 540
tacgtaacag gtgctgagca tttaataatt acctactatt ttctaaatta gtaaattgta 600
tgtttcttga gcaggaggag atactagagc aatttcaaaa catctccaat tgccaaatcc 660
ctgtgtccga acagattgca ttgctagagt ctgtgaactg gaattt 706

<210> 13
<211> 620
<212> DNA
<213> Pichia angusta

<400> 13
tgacattcca caccaacttc tgccgccacc actgcaatcc tgtaggcgaa caggacgatg 60
caggactatt tctctatttt ttcccatcgt gcaccctgaa ccaatacggg ggaggcatgg 120
gaattttccg cgctaatcca gtcaacggta acaagaccag gatggagttt gaatatttct 180
ttgacggcag cgatgaggag ttcgaggcct acttcaagtt tgccagacag gtcgcactcg 240
aggatatttg gctgtgtgag gcggcccaac agaaccttat aagtggggtg taccaacagg 300
gcttgctgca tcctaaaaaa gaagtcgggg tggtttacta ccagtcgctg gttcgtgaaa 360
gaataatggc ttagctccga gatgtggagg cagtctggtc agactgtgcg gcaattaaat 420
aagacgcgga tgtactgcac cagagtgaat aaaggaattc caattcgata gcaaatattg 480
ctgtaataat gagtgaccag atttattacc gaacctagcc agcccggggt tttttacaca 540
ataggaaaaa aaggactcga ttattcgatg ctgctgcaaa tcacgccaga cataataagt 600
cacccgttta ctccgcatgc 620

<210> 14
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<400> 14
tgcctgcagc gccagacata ataagtcacc 30

<210> 15
<211> 523
<212> DNA
<213> Pichia angusta

<400> 15
ctgcagcgcc agacataata agtcacccgt ttactccgca tgcactcccc cactgatcat 60
gattaatggt tctggacggc taaatcattg atcactgcgt cccggacctc gtaccgacgt 120
ggaaattagc cggcactcgg ttgtgagaga ttatcctata taaaccacaa aatcctatct 180
ccctttttgcc aatgaaaggt ttactttatt acggtacaaa cgatattcgc tactccgaaa 240
cggttcctga accggagatc aagaatccca acgatgtcaa gatcaaagtc agctattgtg 300
gaatctgtgg cacggacttg aaagaattca catattctgg aggtcctgtt tttttcccta 360
aacaaggcac caaggacaag atttcgggat acgaacttcc tctctgtcct ggacatgaat 420
ttagcggaac ggtggtcgag gttggctctg gtgtcacaag tgtgaaacct ggtgacagag 480
tcgcagttga agctacgtcg cattgctccg acagatcgca tgc 523

<210> 16
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<400> 16
tgctcatgaa aggtttactt tattacggta 30

<210> 17
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:an artificially synthesized primer sequence

<400> 17
cagtctagat taggaaacct cgttcggc 28